I (WE) CLAIM:

1. A method for axial whitening in diagnostic ultrasound imaging, the method comprising:

(a) for an impulse-transmit total transfer function, compensating for one of: a substantially non-linear spectral phase within an imaging frequency band and a substantially non-equal spectral magnitude;

(b) applying a transmit waveform responsive to (a) to a transducer;

(c) applying signals responsive to (b) to a detector, the signals having a substantially white spectral amplitude and a substantially linear spectral phase within the imaging frequency band.

2. The method of Claim 1 wherein (a) comprises using different transmit parameters than provided with the transmit parameters set at a widest possible bandwidth.

3. The method of Claim 1 wherein (a) comprises setting a programmable transmit filter other than at a widest band setting.

4. The method of Claim 1 wherein the impulse-transmit total transfer function is a total transfer function of an imager from transmit, propagation, echo, receive and receive processing until detection where any programmable characteristic on transmit is set to a widest bandwidth available.

5. The method of Claim 1 further comprising:

(d) obtaining echo data responsive to (b) at the imaging frequency band centered at one of: a transmit fundamental frequency and a harmonic of the fundamental transmit frequency.

6. The method of Claim 1 wherein (a) comprises compensating for both the substantially non-linear spectral phase within the imaging frequency band and the substantially non-equal spectral magnitude.

7. The method of Claim 1 wherein (a) comprises compensating for the substantially non-linear spectral phase within the imaging frequency band.

8. The method of Claim 1 wherein (a) comprises compensating for the substantially non-equal spectral magnitude.

9. The method of Claim 1 wherein (b) comprises generating the transmit waveform having a first spectral magnitude content having a main lobe with two peaks on opposite sides of a fundamental transmit frequency, a spectral amplitude at the fundamental transmit frequency being less than 30 dB down from a greatest amplitude of the two peaks.

10. The method of Claim 1 wherein (b) comprises accentuating spectral magnitude content at side bands of a main lobe as compared to a widest bandwidth transmit waveform, and wherein (c) comprises receiving the signals with a second spectral content, the second spectral content having a wider bandwidth than for the widest bandwidth transmit waveform, the wider bandwidth being a function of the accentuation.

11. The method of Claim 1 wherein (c) comprises applying the signals having a whiter signal than associated with transmissions of whitest transmitter settings.

12. The method of Claim 1 wherein (c) comprises applying signals having the spectral magnitude with a ratio of -6 dB bandwidth to -20 dB bandwidth greater than 0.64 and a spectral phase within the imaging frequency band given by -6 dB down with less than 91 degrees of variance where any linear trend of the phase removed.

13. The method of Claim 1 wherein (a) and (b) comprise generating the transmit waveform with spectral content accentuated from wideband as a function of a transfer function of an imaging system from transmit until detection, and wherein (c) comprises detecting the signals having a wider band of spectral content at the imaging frequency band in response to the accentuated transmit waveform than from the transmit waveform at as wideband as possible without the accentuation.

14. A method for axial whitening in diagnostic ultrasound imaging, the method comprising:

(a) generating transmit waveforms as a function of a system transfer function representing transmit and receive operation until detection, the transmit waveforms being different than widest bandwidth transmit waveforms available; and

(b) applying signals responsive to (a) to a detector, the signals having a wider spectral magnitude at -6 dB down than where the transmit waveforms are at the widest bandwidth available.

15. A method for axial whitening in diagnostic ultrasound imaging, the method comprising:

(a) generating a transmit pulse having a first spectral content with a main lobe with two peaks on opposite sides of a center fundamental transmit frequency, a spectral amplitude at the center fundamental transmit frequency being less than 30 dB down from a greatest amplitude of the two peaks;

(b) applying the transmit pulse to a transducer;

(c) receiving signals responsive to (b), the signals having a first bandwidth at 6 dB down of at least 50% of an available imaging bandwidth.

16. The method of Claim 15 wherein the spectral amplitude at the center fundamental transmit frequency is less than 15 dB down from the greatest of the two peaks.

17. A method for axial whitening in diagnostic ultrasound imaging, the method comprising:

(a) generating a transmit pulse having a first spectral content with a center of amplitude mass of the main lobe and the frequency at the greatest amplitude are at least 15% different in frequency;

(b) applying the transmit pulse to a transducer;

(c) receiving signals responsive to (b), the signals having a first bandwidth at 6 dB down of at least 50% of an available imaging bandwidth.

18. The method of Claim 17 wherein the center of amplitude mass of the main lobe and the frequency at the greatest amplitude are at least 25% different in frequency.

19. The method of Claim 15 wherein the main lobe corresponds to 30 dB down from the greatest amplitude.

20. A method for axial whitening in diagnostic ultrasound imaging, the method comprising:

(a) generating a transmit pulse having a first spectral content with a slope in amplitude substantially at a peak of an impulse transmit transfer function is less than 7 dB per octave and the spectral amplitude at the center fundamental frequency is greater than 5 dB down from the greatest amplitude;

(b) applying the transmit pulse to a transducer;

(c) receiving signals responsive to (b), the signals having a first bandwidth at 6 dB down of at least 50% of an available imaging bandwidth.

21. The method of Claim 15 wherein (c) comprises receiving centered at the center fundamental transmit frequency, the two peaks being within 75% of the fundamental transmit frequency.

22. The method of Claim 15 wherein (c) comprises receiving at a second harmonic of the center fundamental transmit frequency, the two peaks being at

frequencies at least 25% less than the second harmonic of the center fundamental transmit frequency.

23. The method of Claim 15 wherein (a) comprises generating the transmit pulse with the spectral content operable to compensate for a transfer function of at least one of transducer, propagation and receive processing, wherein (c) comprises receiving with a second spectral content being white within the 6 dB down bandwidth.

24. The method of Claim 23 wherein (a) comprises pre-distorting a transmit waveform, the pre-distortion accentuating the spectral content at the side bands of the main lobe as compared to the transmit waveform without the pre-distortion, and wherein (c) comprises receiving the signals with a second spectral content, the second spectral content having a wider bandwidth than for the transmit waveform without pre-distortion as a function of the accentuation.

25. The method of Claim 15 wherein (a) comprises generating a chirp transmit pulse.

26. The method of Claim 15 wherein (c) comprises receiving with the signals having a substantially flat spectral amplitude throughout the bandwidth.

27. The method of Claim 15 wherein (c) comprises receiving with the first bandwidth at 6 dB down of at least 60% of an available imaging bandwidth.

28. The method of Claim 15 wherein (c) comprises receiving with the first bandwidth at 6 dB down of at least 70% of an available imaging bandwidth.

29. The method of Claim 15 wherein (c) comprises receiving with the first bandwidth being of a signal-to-noise ratio limited available imaging bandwidth.

30. The method of Claim 15 wherein (c) comprises receiving with the first bandwidth being of a system response limited available imaging bandwidth.

31. The method of Claim 1 wherein (c) comprises applying the signals having the spectral magnitude with the ratio greater than 0.70.

32. The method of Claim 1 wherein (a) comprises using a chirp encoded transmit function and further comprising:

(d) decoding the chirp encoding prior to applying signals to a detector.

33. The method of Claim 1 wherein (a) comprises using amplitude windowing of a chirp encoded transmit function by pulse width modulation.

34. The method of Claim 15 wherein (a) comprises using amplitude windowing of a chirp encoded transmit function by pulse width modulation.

35. The method Claim 17 wherein (a) comprises using amplitude windowing of a chirp encoded transmit function by pulse width modulation.

36. The method of Claim 20 wherein (a) comprises using amplitude windowing of a chirp encoded transmit function by pulse width modulation.